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AUTHOR Laine, Colin J.
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ABSTRACT

The FUTURES program was developed by the Ontario (Canada) Ministry of Skills Development in order to better prepare severely disadvantaged and disabled youth in terms of both academic and job-readiness training. This study sought to construct a portrait of FUTURES students which would contain data readily translatable to counseling and instructional strategies. The sample consisted of 63 applicants to the Pre-Employment Preparation component of the program at Fanshawe Community College (London, Ontario). To identify the students' cognitive style or problem-solving ability, tasks from the Structure of Intellect Learning Abilities Test were administered. A cognitive profile was compiled using the average scores. The profile indicated that students would gain more in learning when given opportunities for discovery learning as compared to a lecturing or expository style of teaching. Students showed weak evaluation skills and impulsivity in problem solving and work environments. Mathematics was the weakest achievement area of applicants, and math scores correlated significantly with all cognitive dimensions. Job-readiness skills were relatively strong. Includes 20 references. (JDD)

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A PORTRAIT OF 'FUTURES' CLIENTS AND THEIR INSTRUCTIONAL NEEDS.

by

Colin J. Laine, ED.D

Faculty of Education
The University of Western Ontario
London, Ontario, Canada.

Abstract

This paper reports on an exploratory study which examined the cognitive style of students enrolled in an employment training program for severely disadvantaged and disabled youth. Differences found between individuals and groups were translated to individual instructional and counselling strategies.

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A PORTRAIT OF 'FUTURES' CLIENTS AND THEIR INSTRUCTIONAL NEEDS.

Many disadvantaged adolescents and young adults find themselves unable to secure employment due primarily to a lack of formal schooling and training. Education statistics indicate that disadvantaged and disabled students are less likely to complete secondary school and will also be less prepared for employment than non-handicapped youth. A consequence of these disappointing features has been the development of programs designed to bridge the gap for disadvantaged and disabled youth in terms of both academic and job-readiness training. One such program, developed by the Ontario Ministry of Skills Development, is the FUTURES program.

While this program has flourished, data about the students upon which meaningful instruction and evaluation can be based, are limited. There is also a lack of consistency across sites in the type of information collected, and the way in which relevant information is collected and disseminated to teachers and counsellors working within the program. The aim of this study was to construct a portrait of 'Futures' students which would contain data readily translateable to counselling and instructional strategies.

Program and Population

FUTURES is a single program which provides Pre-Employment Preparation (PEP) with work placement, and Work Experience Preparation (WEP) options to severely disadvantaged and disabled youth (16-24). This training includes counselling, career clarification, life skills, academic and/or literacy upgrading and basic vocational skills. PEP students may participate in the pre-employment option for up to 16 weeks; successful students are then eligible for 16 to 52 weeks of "on-the-job" experience and training.

FUTURES is a consolidation of several youth-related government programs, and has been in operation since November 1985. Currently, FUTURES is available through 22 Community Colleges operating 70 sites in Ontario which have accommodated an average of 8800 PEP students on a continuous intake operation.

Eligible applicants are assessed for vocational interests and aptitudes, current academic standing, and ability to pursue further upgrading. Participants are selected based on a priority of the most disadvantaged among applicants who have the capacity to learn and to withhold physically violent behaviour (Ministry of Skills Development, 1987; Pp.10, 21).

Method

The sample for this study was formed from all 63 eligible applicants to one of the PEP options at Fanshawe Community College, London, Ontario over a period of seven months. The sample included a full range of schooling, backgrounds, disabilities and aptitudes. The 16-week program was typical of the program set out in the 1987 Guidelines and offered courses in English, Math, Job Strategies, and Life Skills training. Each student had the services of a counselor, and counselling workshops were also regularly provided. Clients were assessed by in-house tests in Reading, Mathematics, and Job-Readiness Skills. While this information gave an individual sketch of applicants' abilities to the counselors and instructors, a more accurate understanding of a student's needs emerged only after observation of a student's in-class work and behaviour. Often a portrait which related to teaching strategies and expectancies appeared after problems in learning had been encountered.

To supplement the college assessments, we looked for an instrument capable of identifying a student's cognitive style or problem-solving ability, and which could translate these abilities to teaching and counselling strategies. Of current instruments designed to examine the multivariate nature of cognitive abilities, " . . . the most comprehensive . . .is the Structure of Intellect." (Khatena, 1982; p. 33).

Instrumentation and Data Collection

The Structure Of Intellect (SOI) Learning Abilities Test (Meeker & Meeker, 1976) was chosen as it had been found effective in determining learning characteristics and translating these profiles to curriculum and instruction. The test is based on Guilford's (1967) Structure of Intellect (SI) theory which proposed a three-dimensional model of intelligence. The dimensions are:

Operations (Cognition, Memory, Evaluation, Convergent Production, Divergent Production);

Contents (Figural, Symbolic, Semantic); and

Products (Units, Classes, Relations, Systems, Transformations, Implications).

If the Operation of **Cognition** is joined with **Semantic** Content and the Product of **Systems**, a single cell, **CMS**, Cognition of Semantic Systems (following verbal instructions) is formed. The **Reading form** of the test examines a selection of these abilities which have been found to relate significantly to the acquisition of language arts (Cunningham, Thomas, Alston, & Wakefield, 1978; Feldman, 1969; Meeker, 1969) and to programs in special education (Laine, 1989; Meeker, 1976).

The reasons for choosing the SOI were that (1) profiles of cognitive strengths and weaknesses can be produced which may indicate how a person processes information, and (2) it is readily translatable to curriculum and teaching strategies (Cunningham, et al, 1978; Guilford, 1980, 1981; Khatena, 1982; Laine, 1989; Meeker, 1976; Taylor & Michael, 1981). Test-retest reliabilities of dimensions from revised norming samples range from 0.72 - 0.89 (Meeker & Meeker, 1981)).

Stimuli

The tasks used from the SOI Test were as follows:[1]

Foundational Abilities

- **Cognition of Figural Units(CFU)** (visual closure: recognizing familiar figures)

1 For further details and examples of the subtests, see Laine (1987).

- **Cognition of Semantic Units(CMU)** (visual vocabulary)
- **Cognition of Figural Classes(CFC)** (classification: needed for concept development)
- **Evaluation of Figural Units(EFU)** (visual discrimination)
- **Memory of Symbolic Units-visual(MSUv)** (visual attention or concentration, recalling visual symbols).
- **Memory of Symbolic Systems(MSSv)** (recalling strings of symbols, maintaining focus)
- **Memory of Figural Units(MFU)** (recalling incidental details)

Enabling Abilities

- **Cognition of Semantic Relations(CMR)** (relationships among words or ideas)
- **Cognition of Semantic Systems(CMS)** (understanding long sentences, directions or instructions)
- **Evaluation of Figural Classes(EFC)** (judging discriminating features: needed for conceptualization)
- **Convergent Production of Symbolic Transformations(NST)** (word recognition)

Data Analysis of cognitive patterns

Data were analysed to determine relationships among the scores achieved on the Structure of Intellect Reading Form extrapolated to 12 of the 14 dimensions (Divergent Production and Implications were not tested), and the demographic and academic background of the participants.

In the analyses, the cognitive style of the sample was characterized and addressed in three ways: (1) the descriptive characteristics of demographic, achievement scores, and aptitude scores on the SOI subtests; (2) correlations among demographic characteristics, academic achievement and aptitude (SOI) dimensions; and (3) variations among the dimensions of aptitude and achievement by demographic features, using analysis of variance.

Population

There were 63 subjects in this initial study: all enrolled in the FUTURES program. Thirty-one were male; thirty-two were female; they ranged in age from 16 through 24. All subjects had completed

at least grade 8 in school and had been out of school for at least one semester.

Results

The means, standard deviations and correlations for all variables showed that applicants to FUTURES were between 16 and 24 years of age ($\bar{x}$=18.7). Eighty-one per cent were non-native Canadians. They had completed between grades 8 and 10 ($\bar{x}$=9.3) in a general level program. Only 4 subjects came from homes where both parents were alcoholic; 8 students reported only the mother was alcoholic; and 20 reported only the father was alcoholic..

Reading **achievement** on entry ($\bar{x}$=63.8%) was far superior to their math achievement ($\bar{x}$=36.6%); and the students had reasonable job-related skills ($\bar{x}$=72%).

In terms of their cognitive style, or processing skills, the students were more comfortable using **symbolic** information (letters, numbers) ($\bar{x}$=79%) than with ideas or word meanings - **semantics** ($\bar{x}$=71%), and least proficient with diagrams or pictorial - **figural** - information ($\bar{x}$=63%).

Scores on the **Products** dimension indicated a preference for discovering **relationships** ($\bar{x}$=83%) among pieces of information rather than having to follow or sequence information presented essentially intact (**Systems**, $\bar{x}$=73%). Information presented in a variety of alternative ways (**Transformations**, $\bar{x}$=69%) was also seen as a strength. Students were weaker in using details (**Units**, $\bar{x}$=67%) and classification skills (**Classes**, $\bar{x}$=65%): lower level skills essential to achieving a thorough understanding. This pattern is also indicative of relatively low tolerance for frustration (Laine, 1989; Meeker, 1976).

The descriptive analysis indicated a **lack** of a significant or distinct strength in **Operations**. The strongest was **Memory** ($\bar{x}$=74%) followed by comprehension skills (**Cognition**, $\bar{x}$=70%); a weaker ability in **Evaluation** ($\bar{x}$=62%) may have inhibited self-correcting strategies considered essential to effective problem solving (Guilford, 1979). Productivity (Convergent Production, $\bar{x}$=69%) was

also relatively weak indicating that program personnel might expect students to have had a history of slow gains in achievement.

Correlations

The correlations showed that some of the demographic variables were intertwined with academic and cognitive style (aptitude) elements.

Background Characteristics

1. The older students had completed more grades in school (r=0.46).
2. Native students are more likely to have basic or general level education (r =0.33).
3. There were positive and significant relationships between alcoholic fathers and sex (r=0.21), grade completed (r=0.36), and level of program completed (r=0.23). There was also a positive and significant correlation between grade completed and maternal alcoholism (r=0.33). It was inferred from these intercorrelations that males from homes where the father is alcoholic, may have had fewer years of formal schooling and completed their schooling at a basic level. Lower grade completion is also more likely where both parents are alcoholic.

Achievement/Style Relationships

1. **Job Related Skills** appeared to be independent of academic achievement.
2. Scores on the **Math** test were related significantly to **all** twelve general cognitive style traits; however, math scores did not relate significantly to specific classification (**CFC**) or conceptualization (**EFC**) skills.
3. Scores on the Reading test were related significantly to **all** twelve traits **except Memory**, and to **Figural** content.
4. **Job-related skill** scores were generally significantly related to **symbolic** (r=0.24) and **semantic** (r=0.23) information which has been presented **systematically** (r=0.29): observed as following directions, ideas, or plans.

(Specifically, the scores were significantly related to following directions (CMS, r=0.23), memory for sequences of events (MSS, r=0.25), and discrimination of visual clues (EFU, r=0.28)).

Analysis of Variance

Analyses of Variance showed significant differences existed in academic achievement between applicants from different levels of school programs. However, no significant differences were found in achievement due to cultural background, gender, age, or grade completed.

Cognitive Style

Significant differences were found in cognitive style (SOI) between Native and non-native Canadians, among the high school program levels, and among age groups.

No significant differences ($p<0.05$) were found in use of Figural information, details (Units), and Classes between native and non-native students. No differences were found among students from advanced, general, and basic levels in Memory, Classification skills and Systems.

Generally, older students had more productive potential and were more able to deal with different perspectives. Female students had marginally better productivity (F=3.62; p=0.057) and were marginally better at using information from different perspectives (Transformations, F=3.62, p=0.057).

Discussion

The fact that some students have alcoholic parents plays no part in either their achievement or their thinking abilities. Any family problem with alcohol would thus be a counselling, as opposed to an instructional, issue. Further, no significant differences were found in the achievement nor in the cognitive style of applicants based on how many grades they had completed in school. These two issues had been a concern to counsellors in FUTURES in terms of applicants' ability to complete the program successfully and find meaningful employment. If alcohol is a problem in the family, it should not affect the students' capacity

to learn; if anything it may affect their motivation or concentration.

The belief held by FUTURES counsellors that the amount of formal schooling experienced by applicants would affect their cognitive ability to learn was not supported by these results. The type of program the students experienced was the determining factor, therefore counsellors and instructors should be knowledgeable about the nature and content of the different levels of programs in their high schools so that a planned variety of teaching strategies can be used more effectively.

Although native students comprise 19% of eligible applicants, only one applicant completed some secondary education in an advanced level program. The major proportion of Native students completed work only in lowest - basic - level programs. Differences due to culture might be expected and observed in such activities as estimating, discriminating similarities, discriminating internal consistencies of details, using analogies, solving analog problems, use and misuse of misplaced modifiers. These processing abilities are critical to success in most trades and training programs.

Instructional Implications of Cognitive Profiles

A cognitive profile using the average scores, indicated that students would gain more in learning when given opportunities for discovery learning. The strong Relationships score relative to Systems showed that students' learning would be frustrated by a predominant lecturing or systematic expository style of teaching. Using guided discovery of essential details will be an important facilitating strategy to overcome low Units (details) and Classes; showing how facts group together to form classes or concepts will provide openings and avenues to concept formation, which is critical to effective problem solving (see Gagne, 1985); and effective problem solving is observed in efficient productivity which is a relative weakness in these students.

The current pattern of low classes and relatively weak systems and evaluation skills may be observed in low tolerance to

frustration and impulsivity in problem-solving and work environments (Meeker, 1979). Therefore, staying on task is not a skill many applicants would be familiar with; such skills would have to be taught explicitly to develop problem-solving strategies.

While the relatively weak abilities could be remediated through a discovery approach, the lack of a distinct strength in the Operations dimension will likely frustrate skill development. The strongest operation was Memory and, in the absence of good evaluation skills, students would probably revert to previously known, but inefficient, strategies in new learning situations. Developing evaluation skills using relationships of symbolic content (ESR) may be used to increase reflectiveness and assist development of comprehension (Cognition). The primary goal of using these strategies would be to break the (preferred) trial-and-error impulsive strategy.

Implications of Achievement/Cognitive Ability

The academic entry tests appear to examine rote abilities, therefore, their results cannot be generalized to higher-order problem-solving abilities. The math scores correlated significantly with all cognitive dimensions, however, the strongest correlations were to Cognition (r=0.54), to Symbolic content (r=0.64), and Systems (r=0.61). The Cognition of Symbolic Systems is observed in the understanding of rote alpha-numeric systems (basic arithmetic facts). Instructors will have to habilitate those facts, or give the students an alternative (e.g. 'magic cards' or use of calculators) to develop mathematical facility in 16 weeks. Discovery and systematic instruction using concrete examples will be critical, as academically, Math was the weakest achievement area of applicants.

Job-readiness Skills

The major feature of job-readiness skills appeared to be the ability to follow and use instructions systematically. While the JRS scores were relatively strong, the students' Systems scores were not as strong as Relationships and therefore indicated a preference for discovery compared to reception learning and

following directions. Providing exercises in following instructions and directions and working through tasks systematically should assist the development of good job-readiness skills.

Conclusion

WHAT HAS THE STUDY DONE FOR THE PEOPLE IN THE FUTURES PROGRAM?

This exploratory study has shown the potential of the Structure of Intellect model to provide an individual student 'portrait' of intellectual characteristics which is readily translated to instructional and counselling strategies. The teachers in the program now implement instructional strategies based on the information they receive from the counsellors using the SOI. They report having expanded their repertoire of strategies and plan purposefully to include different cognitive strategies in their classwork, in the choice of assignments, materials, and in their evaluation of the students' work. The predictive ability and practical utility of the SOI over the long-term is now being assessed.

The study has also provided program planners with a portrait of the client base from which they can expect to get their students. If this portrait is reflected in other FUTURES programs, then colleges and government agencies can adjust their intake procedures to respond more accurately and effectively to community needs.

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